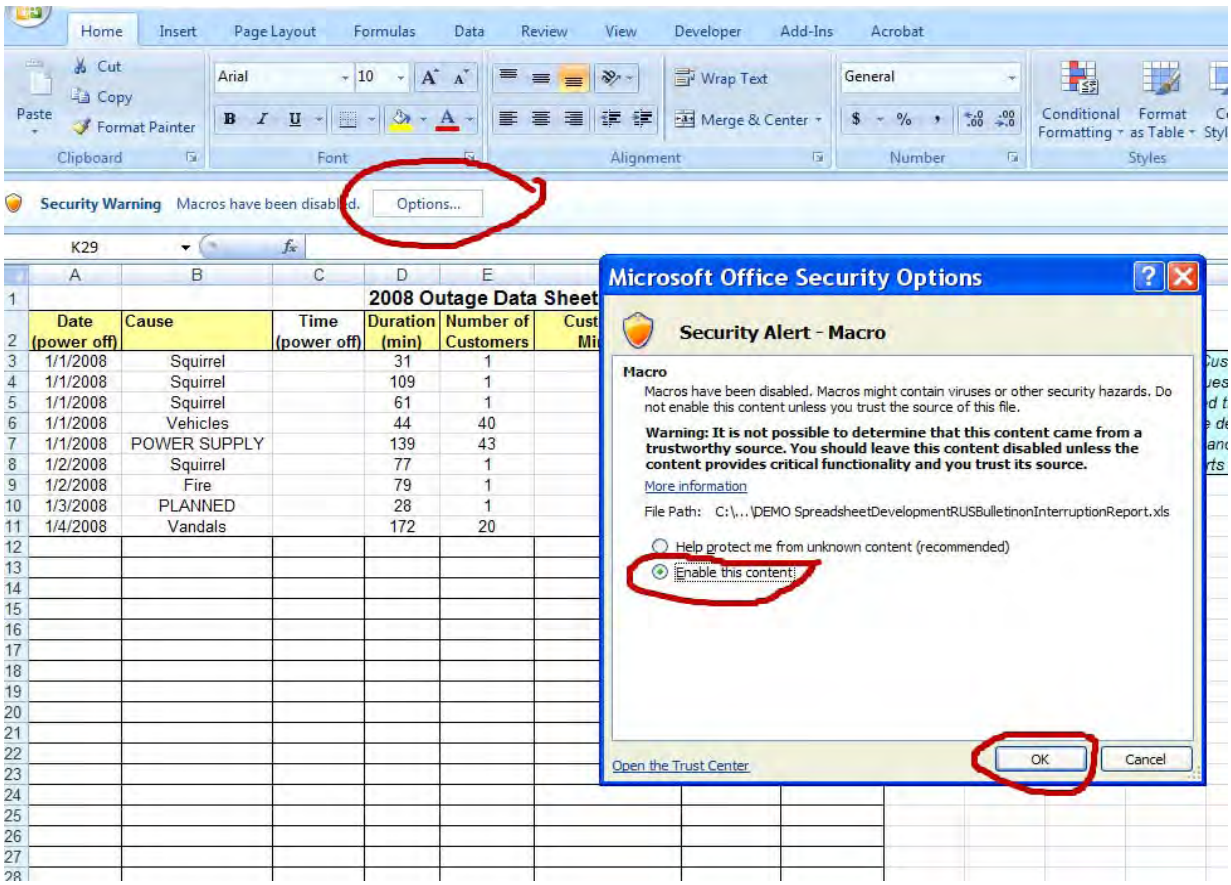
TUTORIAL Version 1
RUS Bulletin 1730a-119 TMED Excel Software
(for Microsoft Office Excel 2007)

Note: *The following excel files are required to complete this tutorial:*

1. *DEMO SpreadsheetDevelopmentRUSBulletinonInterruptionReport.xls*
2. *DEMO outage raw data.xls*

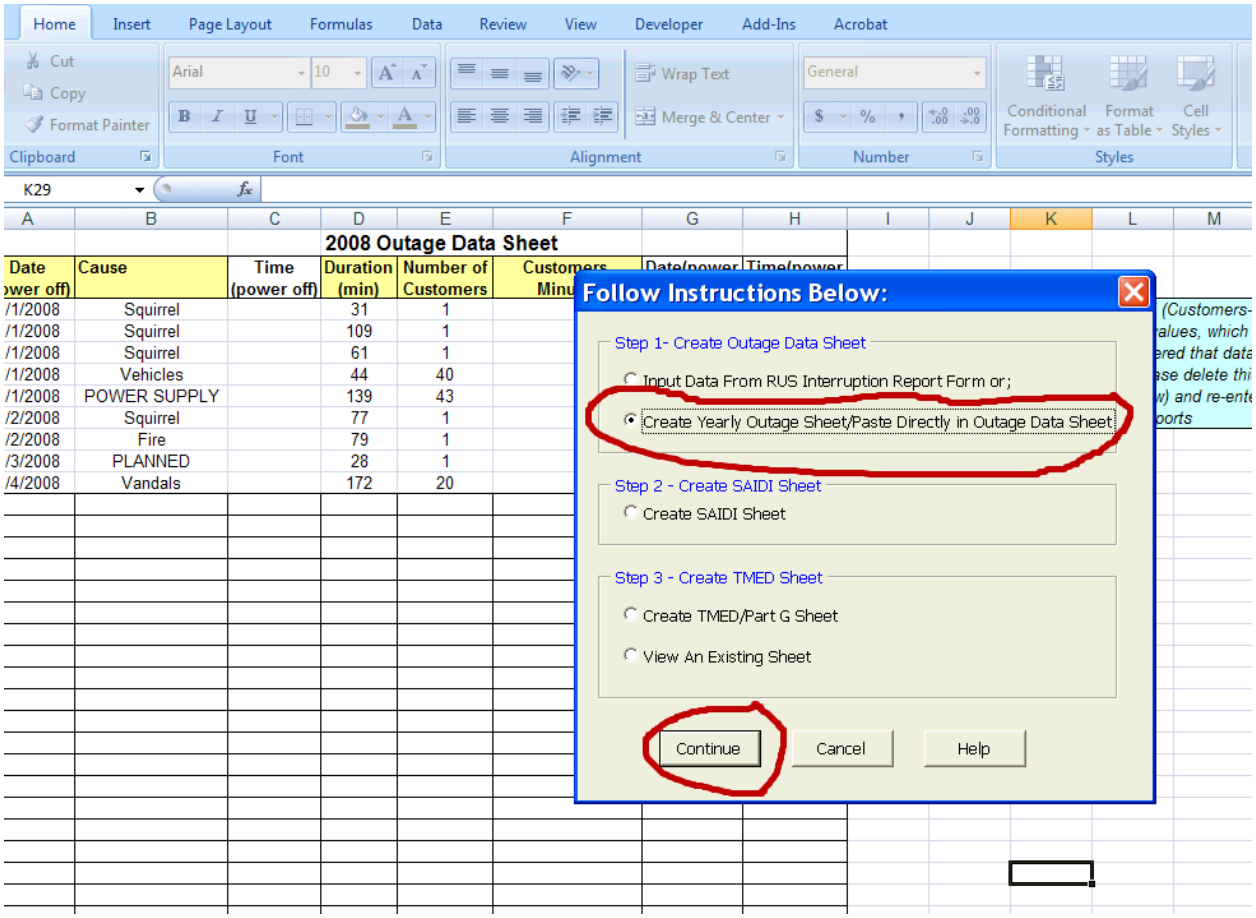
Step 1

- Open **TMED Demo Excel Spreadsheet**
  - *DEMO SpreadsheetDevelopmentRUSBulletinonInterruptionReport.xls*
- Click **"Macro Options"/**Select **"Enable this content"/**Click "OK Button"



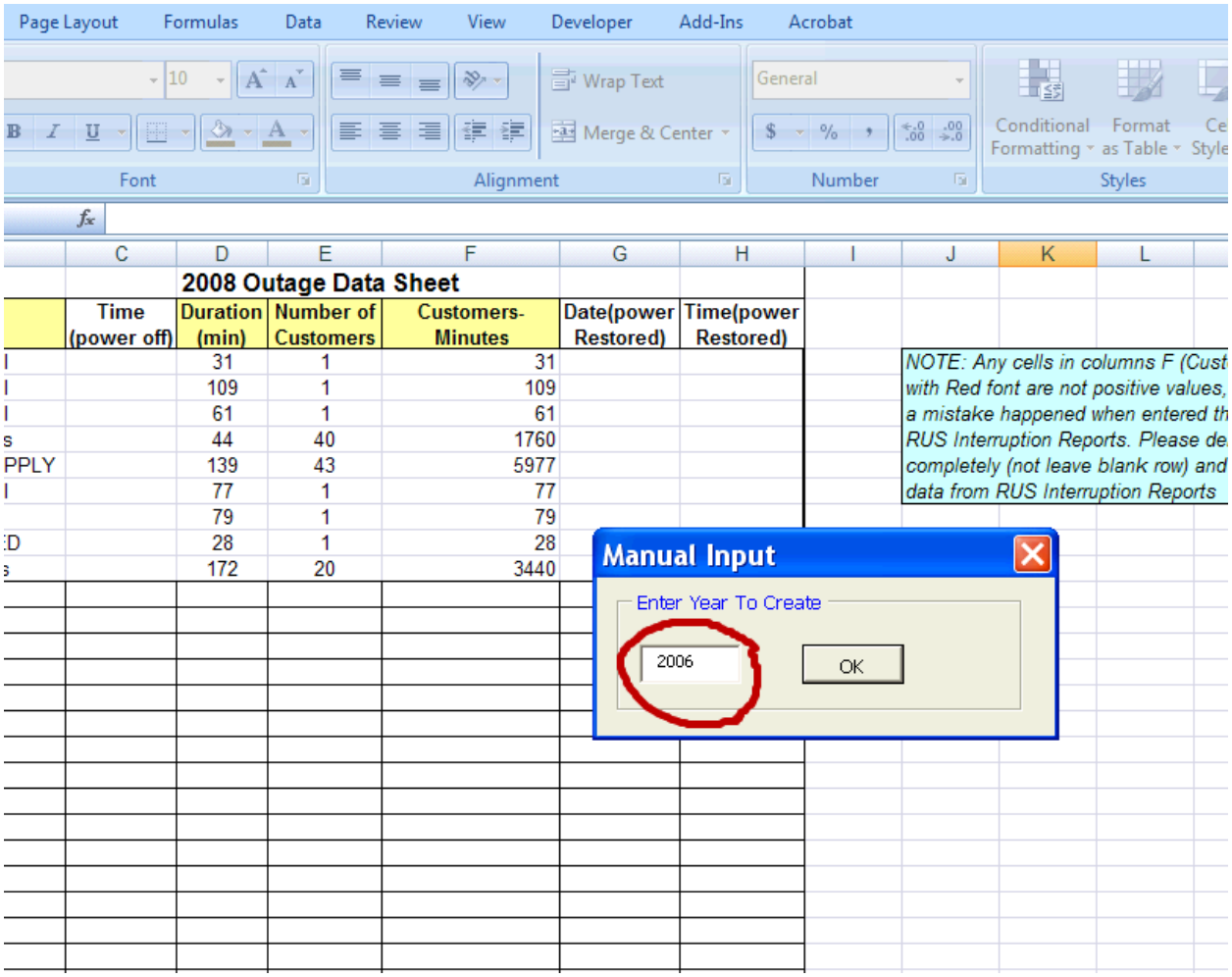
Step 2

- A box titled “Follow Instructions Below” will appear
- Select **“Create yearly Outage sheet/Paste Directly in Outage Data Sheet”** from the “Step 1 – Create Outage Data Sheet” box
- Click “Continue” button



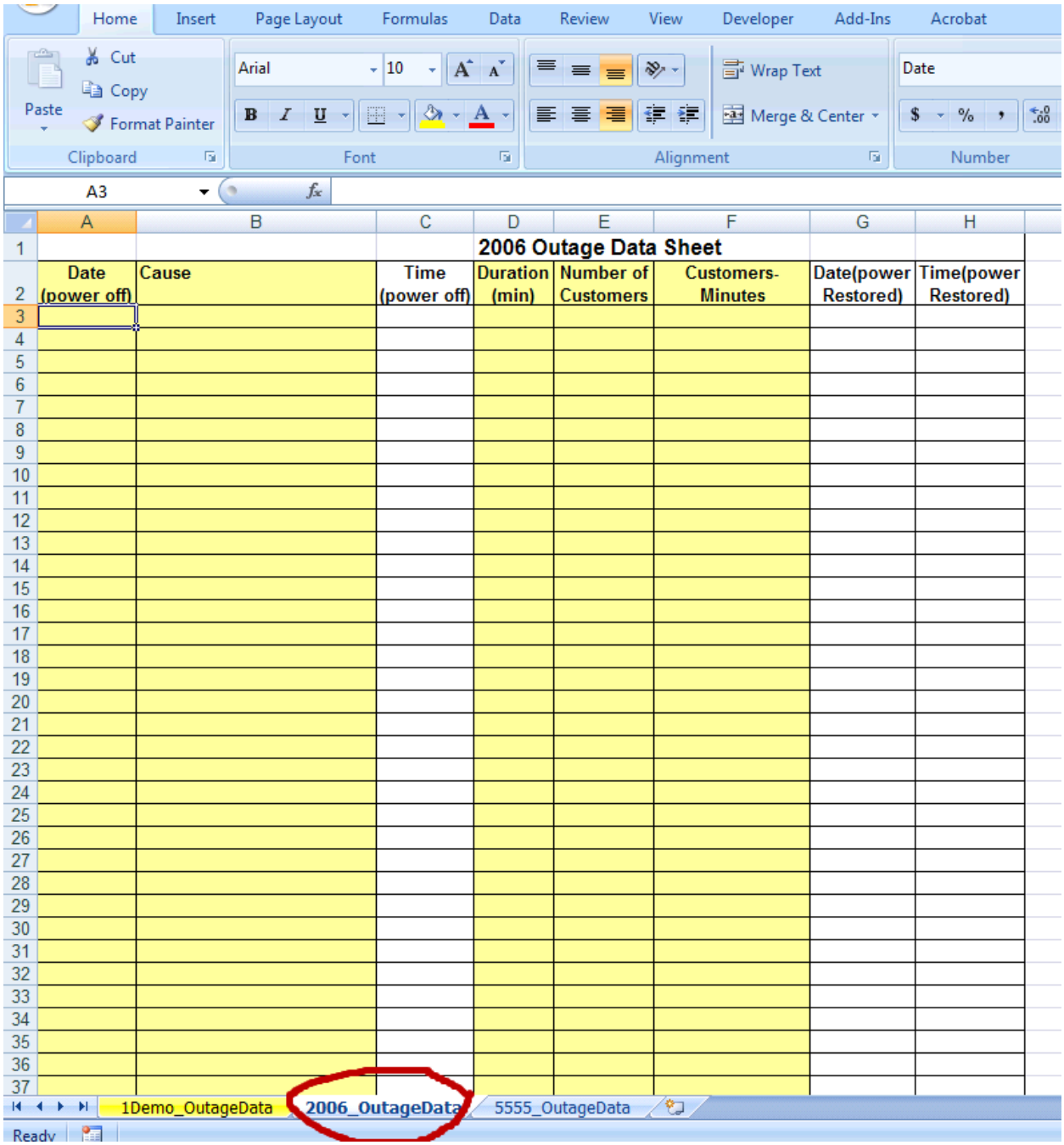
Step 3

- A “Manual Input” box will appear
- Enter the **oldest year** of raw data available – in this demo “2006” is the oldest year, thus, we type **“2006”** on the entry field
- Click “OK”



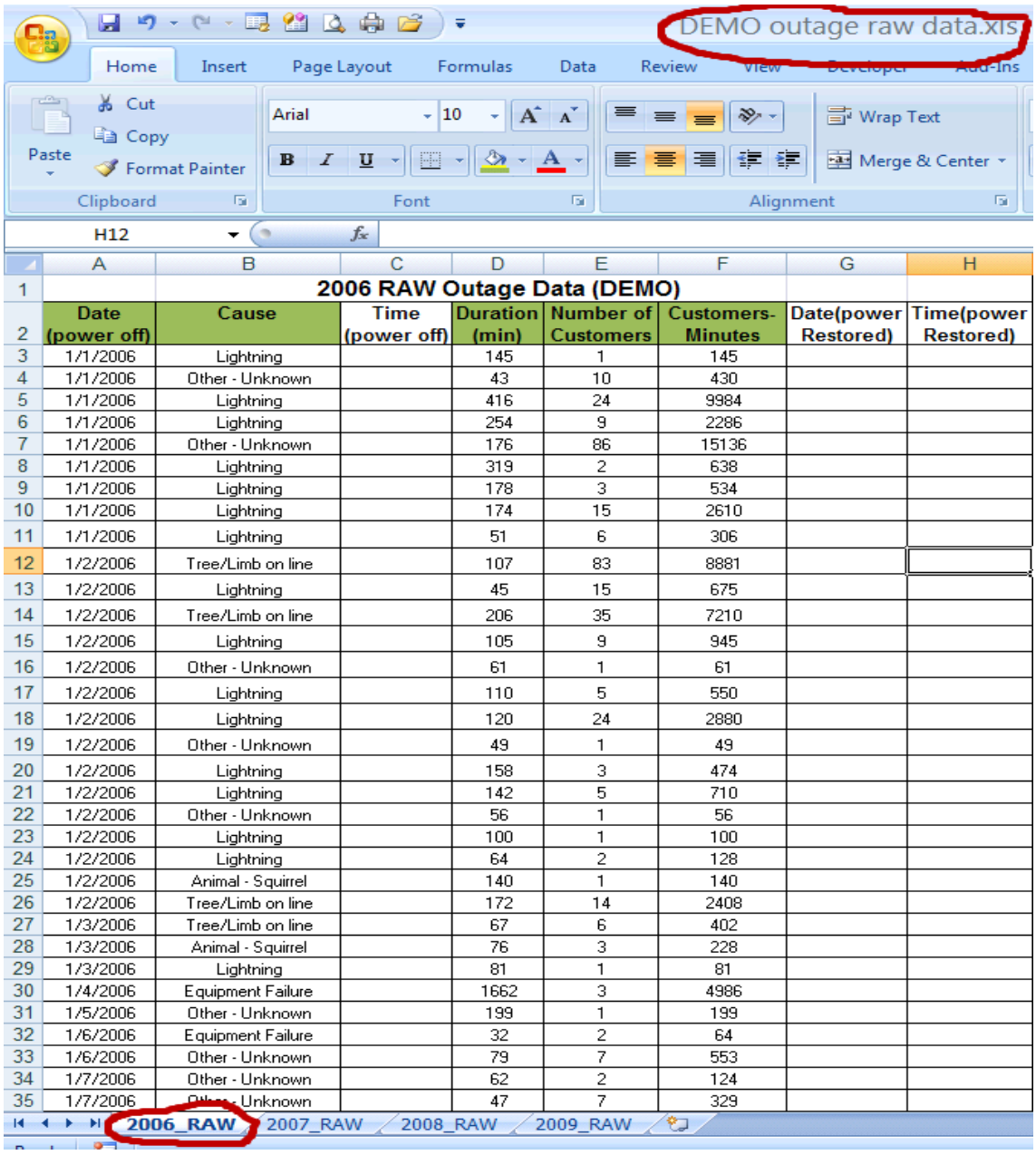
Step 4

- A new blank outage data worksheet titled **"2006_OutageData"** is created



Step 5

- Open **Outage Raw Data Demo** Excel spread sheet
  - *DEMO outage raw data.xls*
- This is the excel file **containing the Raw Data** that we will copy and paste to the **TMED worksheet**



2006 RAW Outage Data (DEMO)

Date (power off)	Cause	Time (power off)	Duration (min)	Number of Customers	Customers-Minutes	Date(power Restored)	Time(power Restored)
1/1/2006	Lightning		145	1	145		
1/1/2006	Other - Unknown		43	10	430		
1/1/2006	Lightning		416	24	9984		
1/1/2006	Lightning		254	9	2286		
1/1/2006	Other - Unknown		176	86	15136		
1/1/2006	Lightning		319	2	638		
1/1/2006	Lightning		178	3	534		
1/1/2006	Lightning		174	15	2610		
1/1/2006	Lightning		51	6	306		
1/2/2006	Tree/Limb on line		107	83	8881		
1/2/2006	Lightning		45	15	675		
1/2/2006	Tree/Limb on line		206	35	7210		
1/2/2006	Lightning		105	9	945		
1/2/2006	Other - Unknown		61	1	61		
1/2/2006	Lightning		110	5	550		
1/2/2006	Lightning		120	24	2880		
1/2/2006	Other - Unknown		49	1	49		
1/2/2006	Lightning		158	3	474		
1/2/2006	Lightning		142	5	710		
1/2/2006	Other - Unknown		56	1	56		
1/2/2006	Lightning		100	1	100		
1/2/2006	Lightning		64	2	128		
1/2/2006	Animal - Squirrel		140	1	140		
1/2/2006	Tree/Limb on line		172	14	2408		
1/3/2006	Tree/Limb on line		67	6	402		
1/3/2006	Animal - Squirrel		76	3	228		
1/3/2006	Lightning		81	1	81		
1/4/2006	Equipment Failure		1662	3	4986		
1/5/2006	Other - Unknown		199	1	199		
1/6/2006	Equipment Failure		32	2	64		
1/6/2006	Other - Unknown		79	7	553		
1/7/2006	Other - Unknown		62	2	124		
1/7/2006	Other - Unknown		47	7	329		

2006_RAW 2007_RAW 2008_RAW 2009_RAW

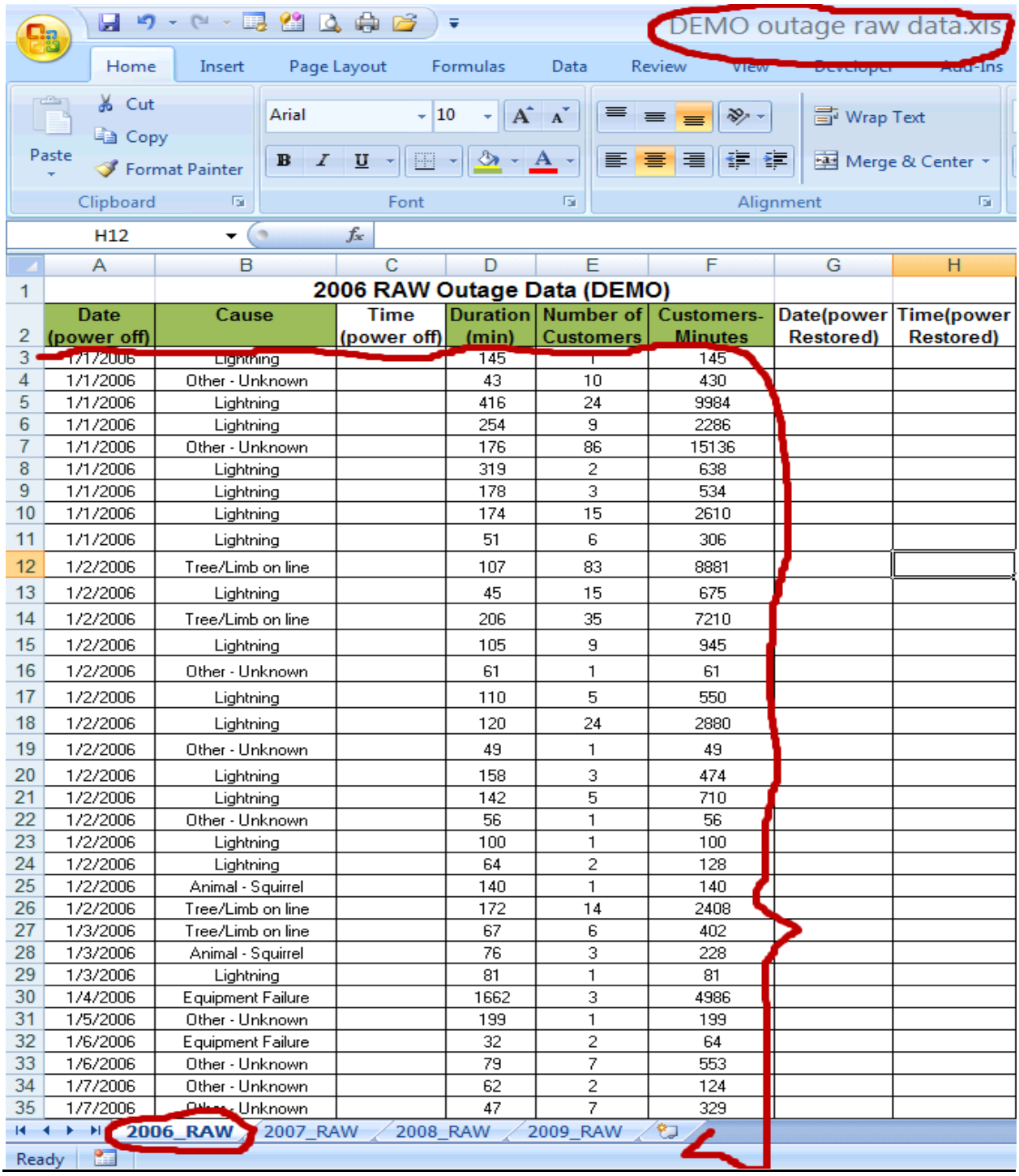
Step 6

**** IMPORTANT Notes prior to copying raw data to the TMED worksheet:**

- All outages with the DURATION (minutes) of **equal or less than 5 minutes should be deleted.**
- Only 'SUSTAINED INTERRUPTION' or outages with a duration of **more than 5 minutes shall be included**
- Columns highlighted in **YELLOW** are the only fields that are required to be filled when PASTING data directly on the TMED Outage Data sheet. The other fields can be left blank.
- DATE (power off) field SHALL contain **Date Entry ONLY** *(i.e. 1/24/2006).*
- **DO NOT COMBINE both DATE & TIME on the date (power off) field** *(i.e. 1/24/2006 1:45 pm)***.** Date/Time combo will cause **ERROR** in the TMED Calculation!
- Make sure that POWER SUPPLY outages are classified as **"POWER SUPPLY"** under "Cause" column.
- Make sure that PLANNED outages are classified as **"PLANNED"** under "Cause" column
- Make sure that you **SORT the Date (Power Off) from Oldest to present**

Step 7

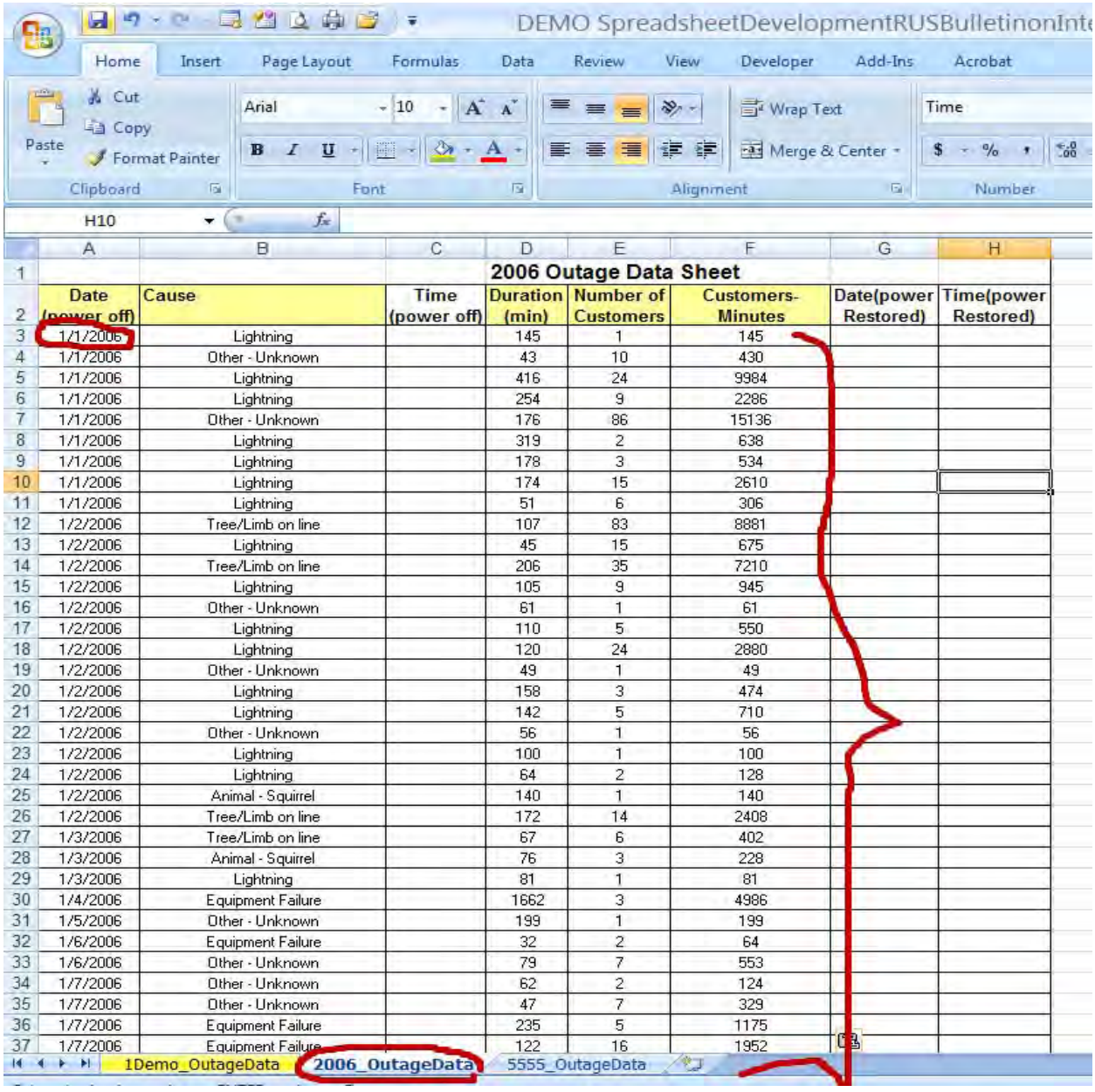
- Click on the **"2006 Outage_Raw"** worksheet of the **"Demo outage raw data.xls"**
- Starting from cell **"A3",** select **row 3 (Column A to F) and the last row** containing the outage data (select all rows containing outage data starting from row 3)
- Press **"Ctrl-C" to Copy** the selected rows



	A	B	C	D	E	F	G	H
1	2006 RAW Outage Data (DEMO)							
2	Date (power off)	Cause	Time (power off)	Duration (min)	Number of Customers	Customers-Minutes	Date(power Restored)	Time(power Restored)
3	1/1/2006	Lightning		145	1	145		
4	1/1/2006	Other - Unknown		43	10	430		
5	1/1/2006	Lightning		416	24	9984		
6	1/1/2006	Lightning		254	9	2286		
7	1/1/2006	Other - Unknown		176	86	15136		
8	1/1/2006	Lightning		319	2	638		
9	1/1/2006	Lightning		178	3	534		
10	1/1/2006	Lightning		174	15	2610		
11	1/1/2006	Lightning		51	6	306		
12	1/2/2006	Tree/Limb on line		107	83	8881		
13	1/2/2006	Lightning		45	15	675		
14	1/2/2006	Tree/Limb on line		206	35	7210		
15	1/2/2006	Lightning		105	9	945		
16	1/2/2006	Other - Unknown		61	1	61		
17	1/2/2006	Lightning		110	5	550		
18	1/2/2006	Lightning		120	24	2880		
19	1/2/2006	Other - Unknown		49	1	49		
20	1/2/2006	Lightning		158	3	474		
21	1/2/2006	Lightning		142	5	710		
22	1/2/2006	Other - Unknown		56	1	56		
23	1/2/2006	Lightning		100	1	100		
24	1/2/2006	Lightning		64	2	128		
25	1/2/2006	Animal - Squirrel		140	1	140		
26	1/2/2006	Tree/Limb on line		172	14	2408		
27	1/3/2006	Tree/Limb on line		67	6	402		
28	1/3/2006	Animal - Squirrel		76	3	228		
29	1/3/2006	Lightning		81	1	81		
30	1/4/2006	Equipment Failure		1662	3	4986		
31	1/5/2006	Other - Unknown		199	1	199		
32	1/6/2006	Equipment Failure		32	2	64		
33	1/6/2006	Other - Unknown		79	7	553		
34	1/7/2006	Other - Unknown		62	2	124		
35	1/7/2006	Other - Unknown		47	7	329		

Step 8

- Click newly created **"2006_OutageData"** worksheet from the **TMED Demo Excel Spreadsheet**
- Click on cell **"A3"** and **press "Ctrl-V" (to paste copied data from "Demo outage raw data.xls")**
- You should now see the data that you have copied from the "**Demo outage raw data.xls"**



Date (power off)	Cause	Time (power off)	Duration (min)	Number of Customers	Customers-Minutes	Date(power Restored)	Time(power Restored)
1/1/2006	Lightning		145	1	145		
1/1/2006	Other - Unknown		43	10	430		
1/1/2006	Lightning		416	24	9984		
1/1/2006	Lightning		254	9	2286		
1/1/2006	Other - Unknown		176	86	15136		
1/1/2006	Lightning		319	2	638		
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1/1/2006	Lightning		51	6	306		
1/2/2006	Tree/Limb on line		107	83	8881		
1/2/2006	Lightning		45	15	675		
1/2/2006	Tree/Limb on line		206	35	7210		
1/2/2006	Lightning		105	9	945		
1/2/2006	Other - Unknown		61	1	61		
1/2/2006	Lightning		110	5	550		
1/2/2006	Lightning		120	24	2880		
1/2/2006	Other - Unknown		49	1	49		
1/2/2006	Lightning		158	3	474		
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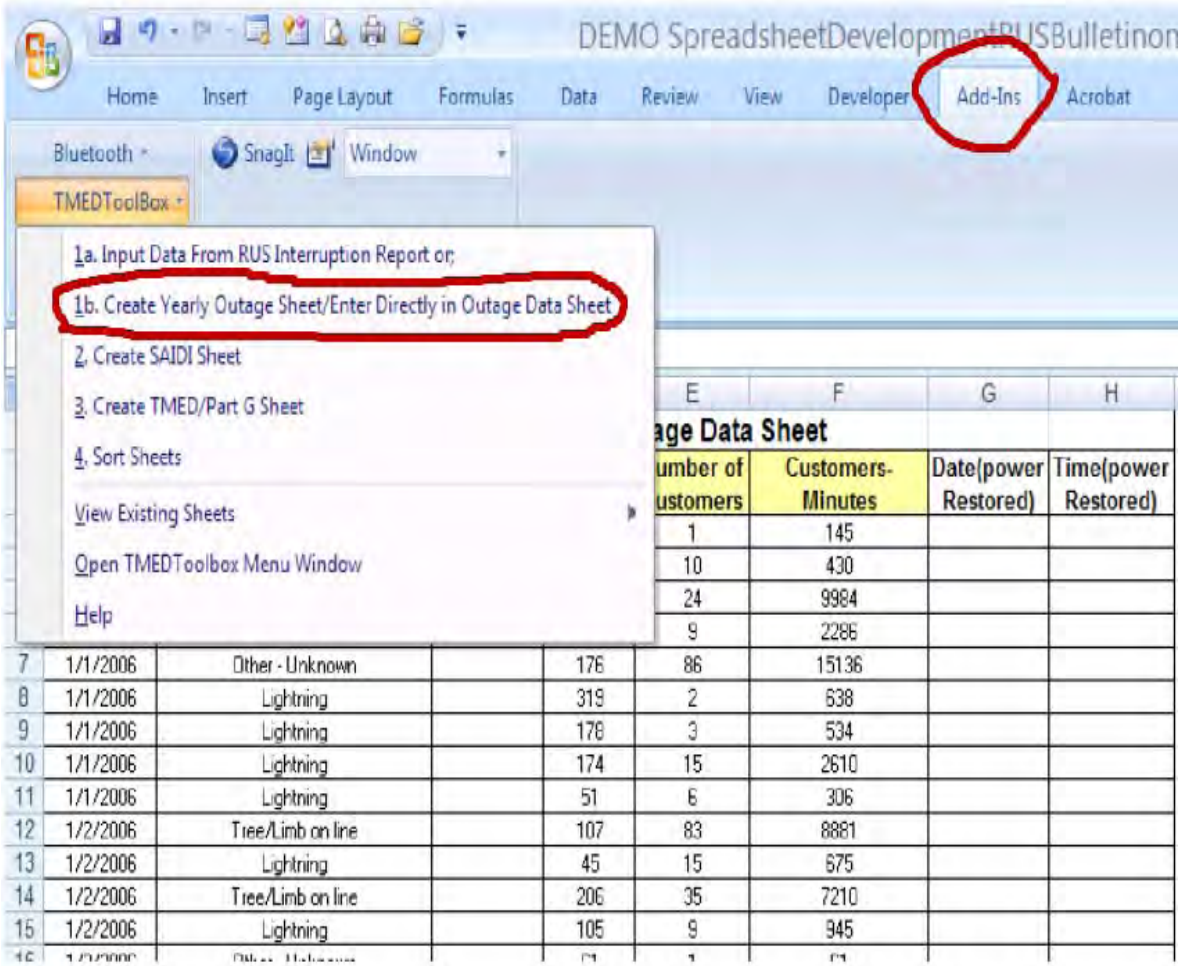
1/2/2006	Other - Unknown		56	1	56		
1/2/2006	Lightning		100	1	100		
1/2/2006	Lightning		64	2	128		
1/2/2006	Animal - Squirrel		140	1	140		
1/2/2006	Tree/Limb on line		172	14	2408		
1/3/2006	Tree/Limb on line		67	6	402		
1/3/2006	Animal - Squirrel		76	3	228		
1/3/2006	Lightning		81	1	81		
1/4/2006	Equipment Failure		1662	3	4986		
1/5/2006	Other - Unknown		199	1	199		
1/6/2006	Equipment Failure		32	2	64		
1/6/2006	Other - Unknown		79	7	553		
1/7/2006	Other - Unknown		62	2	124		
1/7/2006	Other - Unknown		47	7	329		
1/7/2006	Equipment Failure		235	5	1175		
1/7/2006	Equipment Failure		122	16	1952		

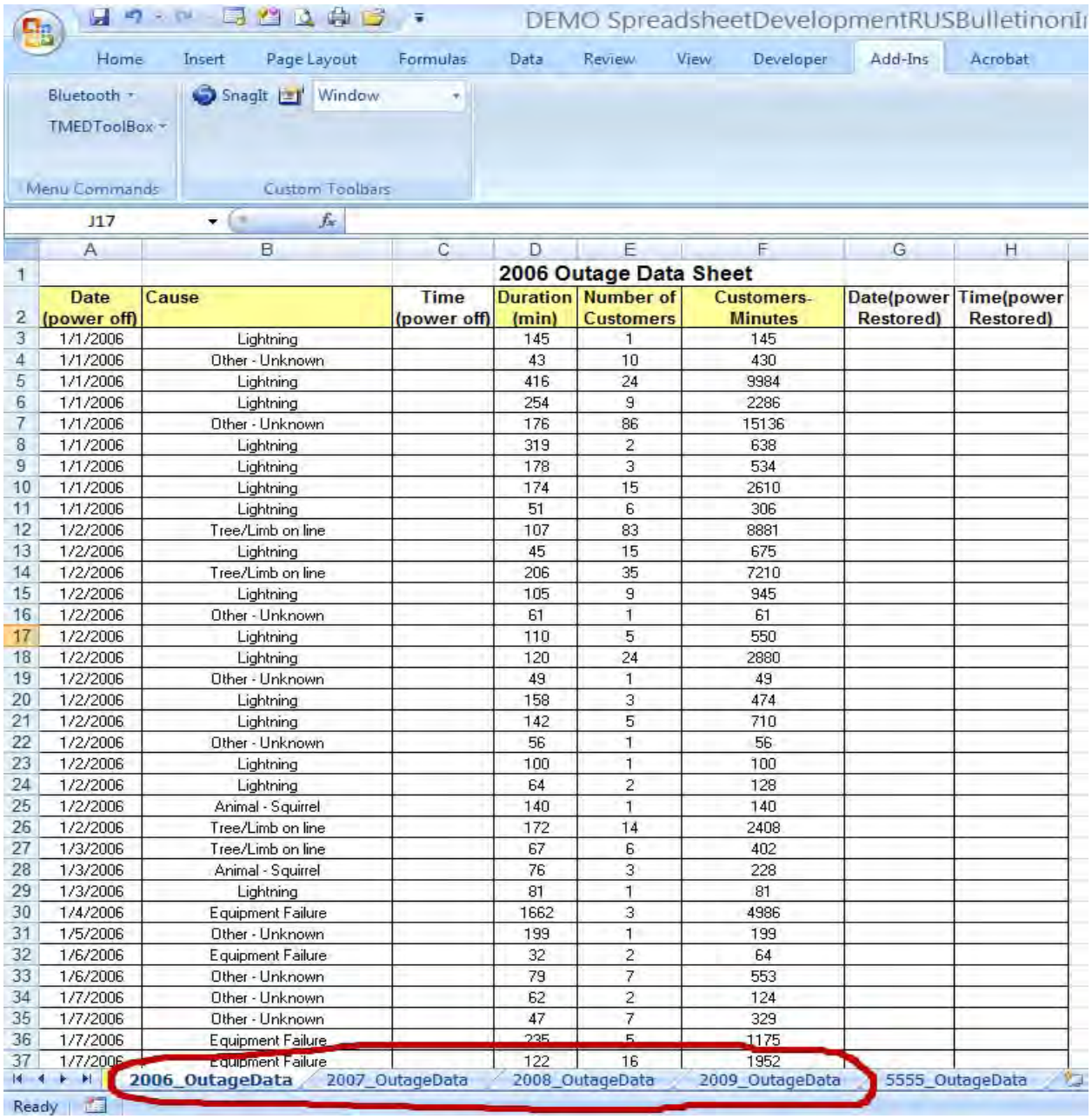
Step 9

- Next, you are ready to create a **new outage data worksheet** for the remaining years **(2007-2009)**
- Click **"Add-Ins"** from the Excel's drop down menu (located on the top of the window)
- Click **"TMEDToolBox"** from the "Add-Ins" submenu and click **"1b.Create Yearly Outage Sheet/Enter Directly in Outage Data Sheet"**
- A "Manual Input" box will appear (similar to Step 2)
- Enter **"2007"** on the entry field
- Click "OK"
- Follow the same procedures from **Step 3 to Step 8 to create the 2007 outage data sheet**
- **Repeat the same steps for the remaining years (2008 and 2009)**



Step 10

- If completed correctly, you should have **2006-2009 outage data worksheets created** and rows populated with outage info on the bottom of the **TMED Demo Excel Spreadsheet**



	A	B	C	D	E	F	G	H
1				2006 Outage Data Sheet				
2	Date (power off)	Cause	Time (power off)	Duration (min)	Number of Customers	Customers-Minutes	Date(power Restored)	Time(power Restored)
3	1/1/2006	Lightning		145	1	145		
4	1/1/2006	Other - Unknown		43	10	430		
5	1/1/2006	Lightning		416	24	9984		
6	1/1/2006	Lightning		254	9	2286		
7	1/1/2006	Other - Unknown		176	86	15136		
8	1/1/2006	Lightning		319	2	638		
9	1/1/2006	Lightning		178	3	534		
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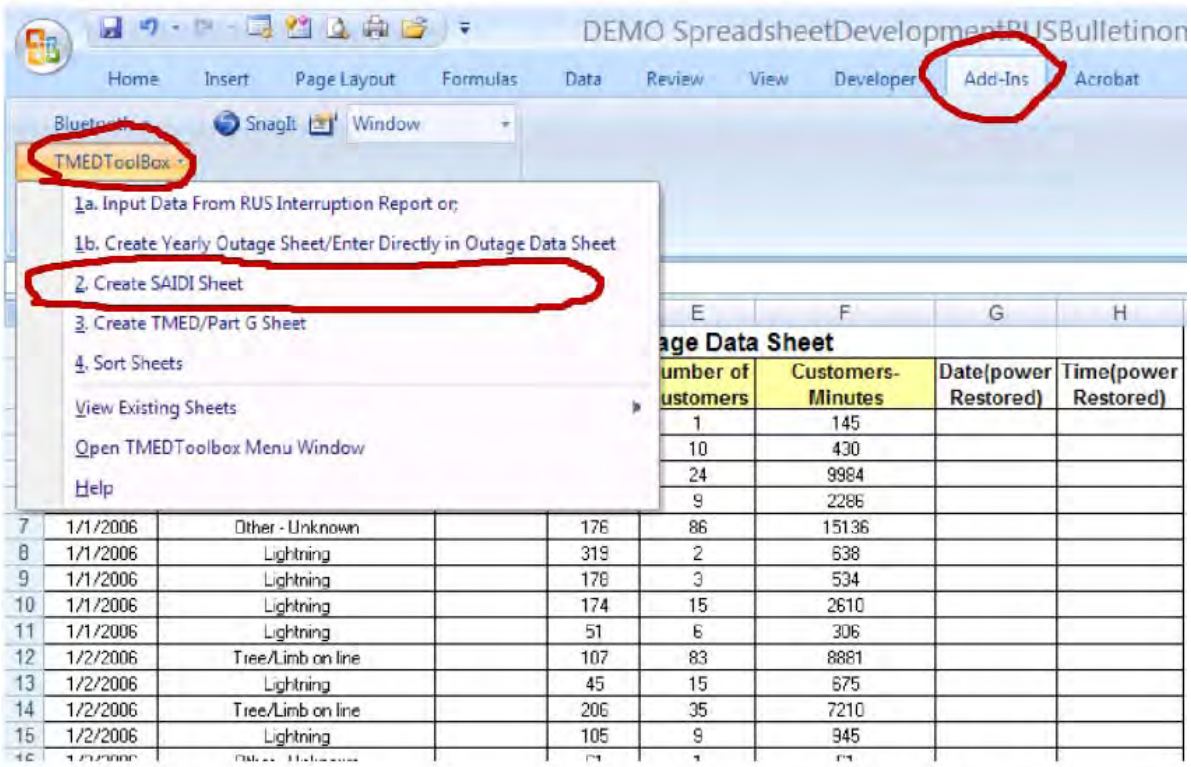
14	1/2/2006	Tree/Limb on line		206	35	7210		
15	1/2/2006	Lightning		105	9	945		
16	1/2/2006	Other - Unknown		61	1	61		
17	1/2/2006	Lightning		110	5	550		
18	1/2/2006	Lightning		120	24	2880		
19	1/2/2006	Other - Unknown		49	1	49		
20	1/2/2006	Lightning		158	3	474		
21	1/2/2006	Lightning		142	5	710		
22	1/2/2006	Other - Unknown		56	1	56		
23	1/2/2006	Lightning		100	1	100		
24	1/2/2006	Lightning		64	2	128		
25	1/2/2006	Animal - Squirrel		140	1	140		
26	1/2/2006	Tree/Limb on line		172	14	2408		
27	1/3/2006	Tree/Limb on line		67	6	402		
28	1/3/2006	Animal - Squirrel		76	3	228		
29	1/3/2006	Lightning		81	1	81		
30	1/4/2006	Equipment Failure		1662	3	4986		
31	1/5/2006	Other - Unknown		199	1	199		
32	1/6/2006	Equipment Failure		32	2	64		
33	1/6/2006	Other - Unknown		79	7	553		
34	1/7/2006	Other - Unknown		62	2	124		
35	1/7/2006	Other - Unknown		47	7	329		
36	1/7/2006	Equipment Failure		235	5	1175		
37	1/7/2006	Equipment Failure		122	16	1952		

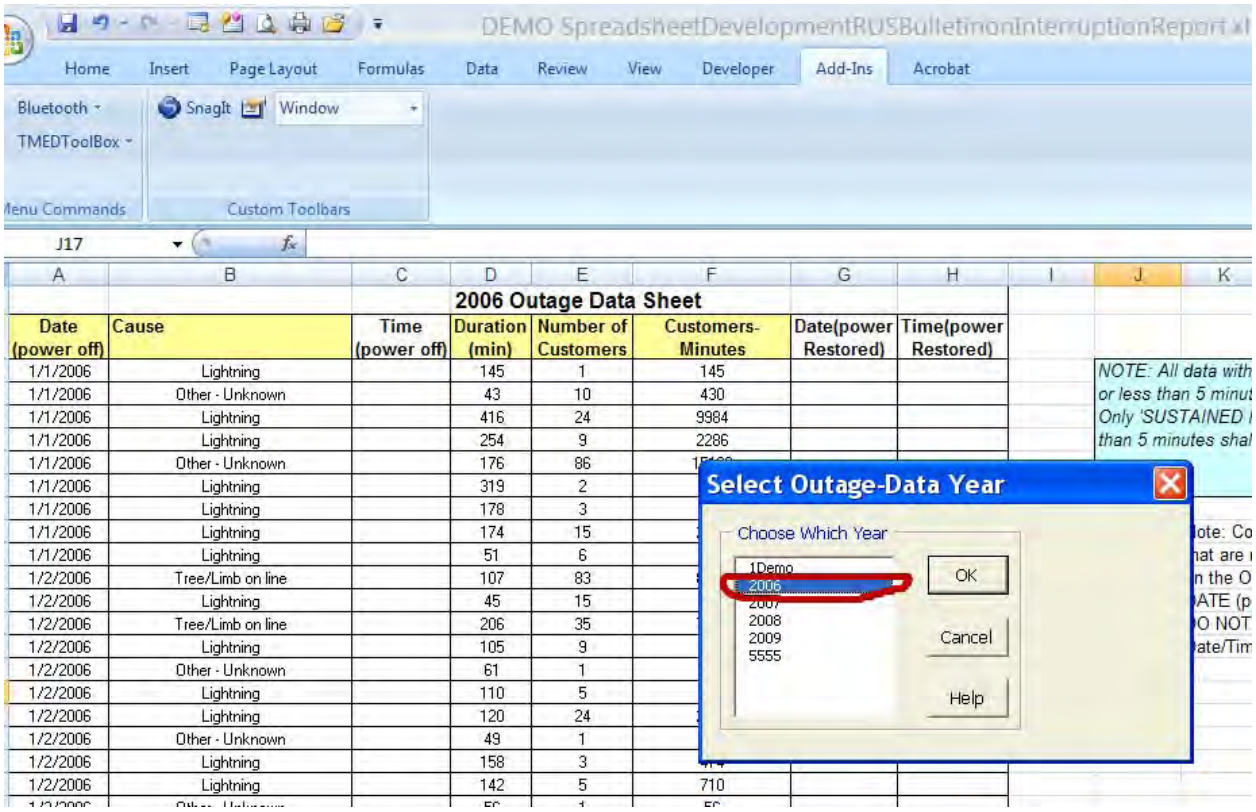
Step 11

- Next, you are ready to calculate the **Daily SAIDI worksheets –** in these worksheets, multiple daily outages are added together and the **SAIDI/day & natural log of SAIDI/day** are calculated
- Click **"Add-Ins"** from the Excel's drop down menu (located on the top of the window)
- Click **"TMEDToolBox"** from the "Add-Ins" submenu and click **"2.Create SAIDI Sheet"**



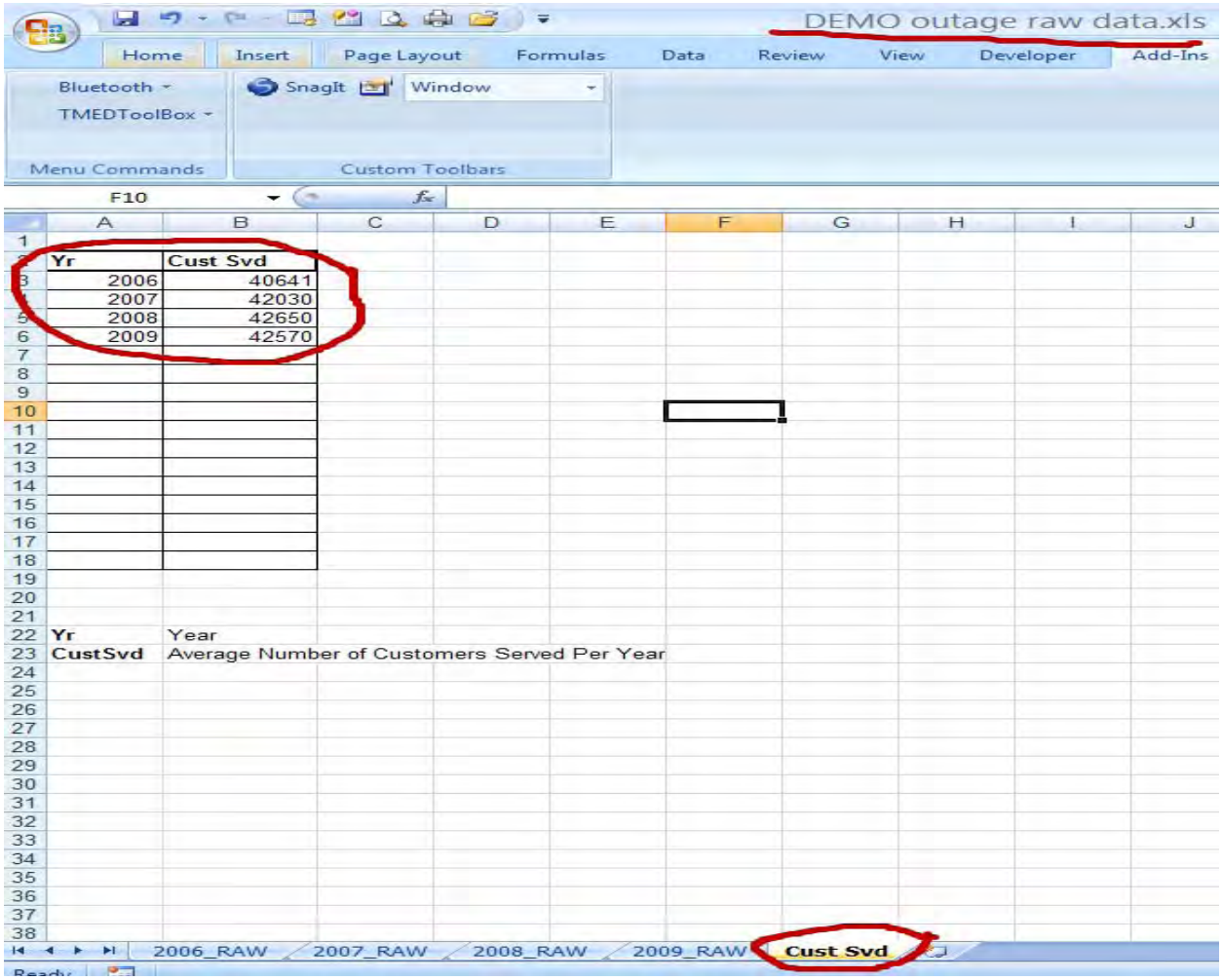
Step 12

- A box called **"Select outage-data year"** will appear
- Click on **"2006"** and click "OK"



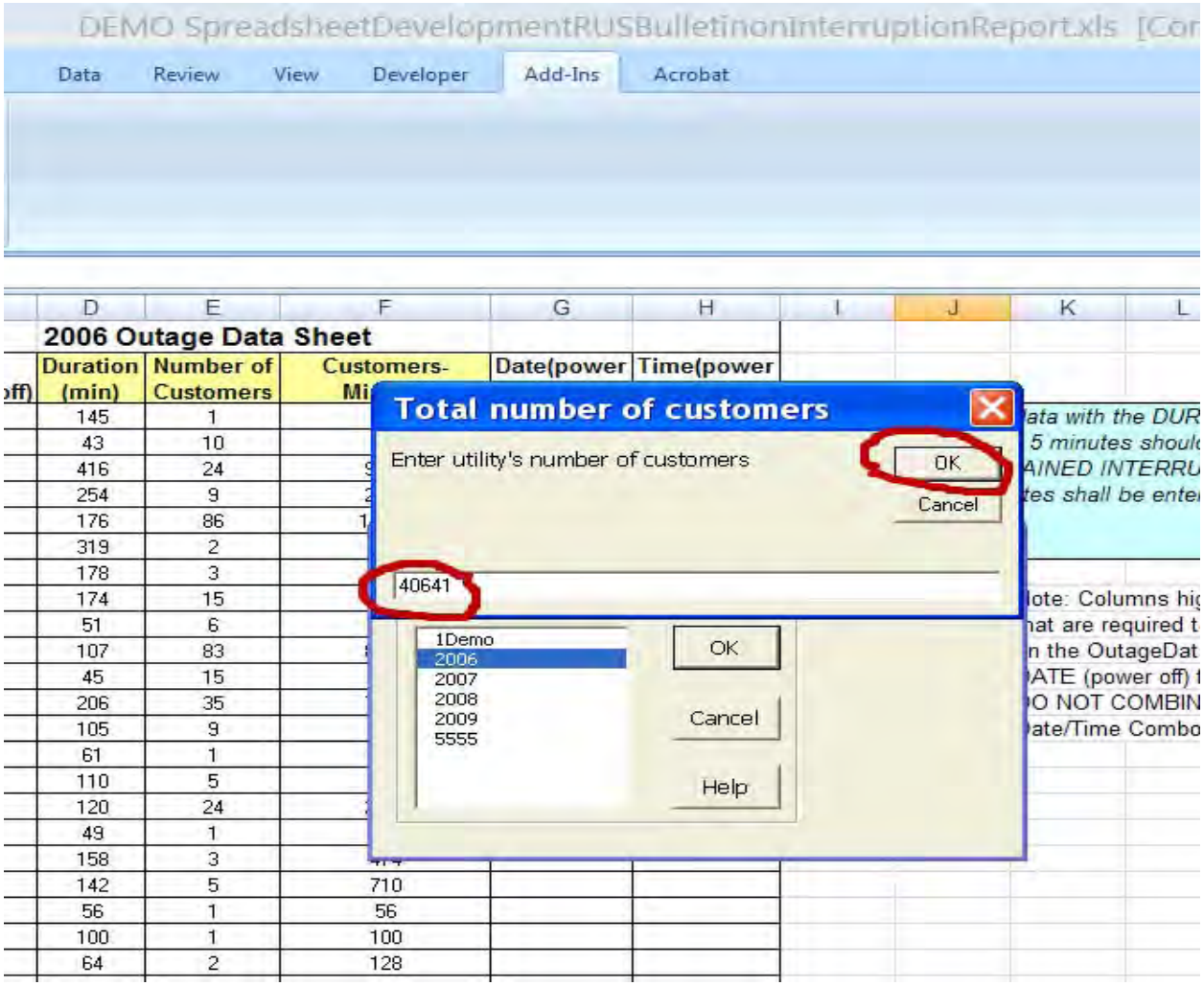
Step 13

- The next step (Step 14) will require you to enter the **average number of customers served per year for 2006**
- The average numbers (for all the years used for this demo) are located on the worksheet **"Cust_svd"** of the **"Demo outage raw data.xls"**
- You are not required to save your customers served per year data in this method (you can save your information in any format you wish)



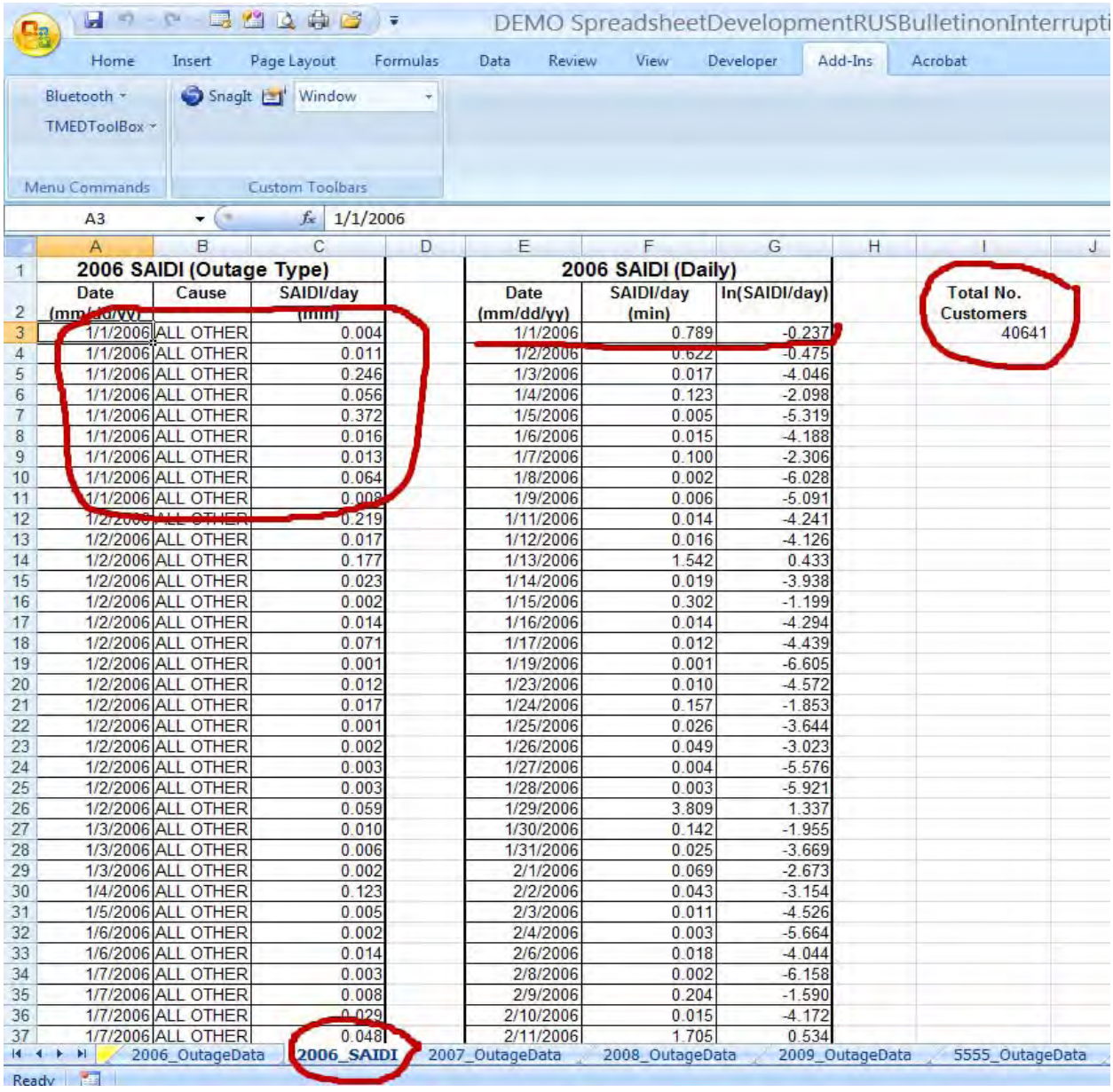
Step 14

- Enter the **average number of customers served per year for 2006** and click “OK”



Step 15

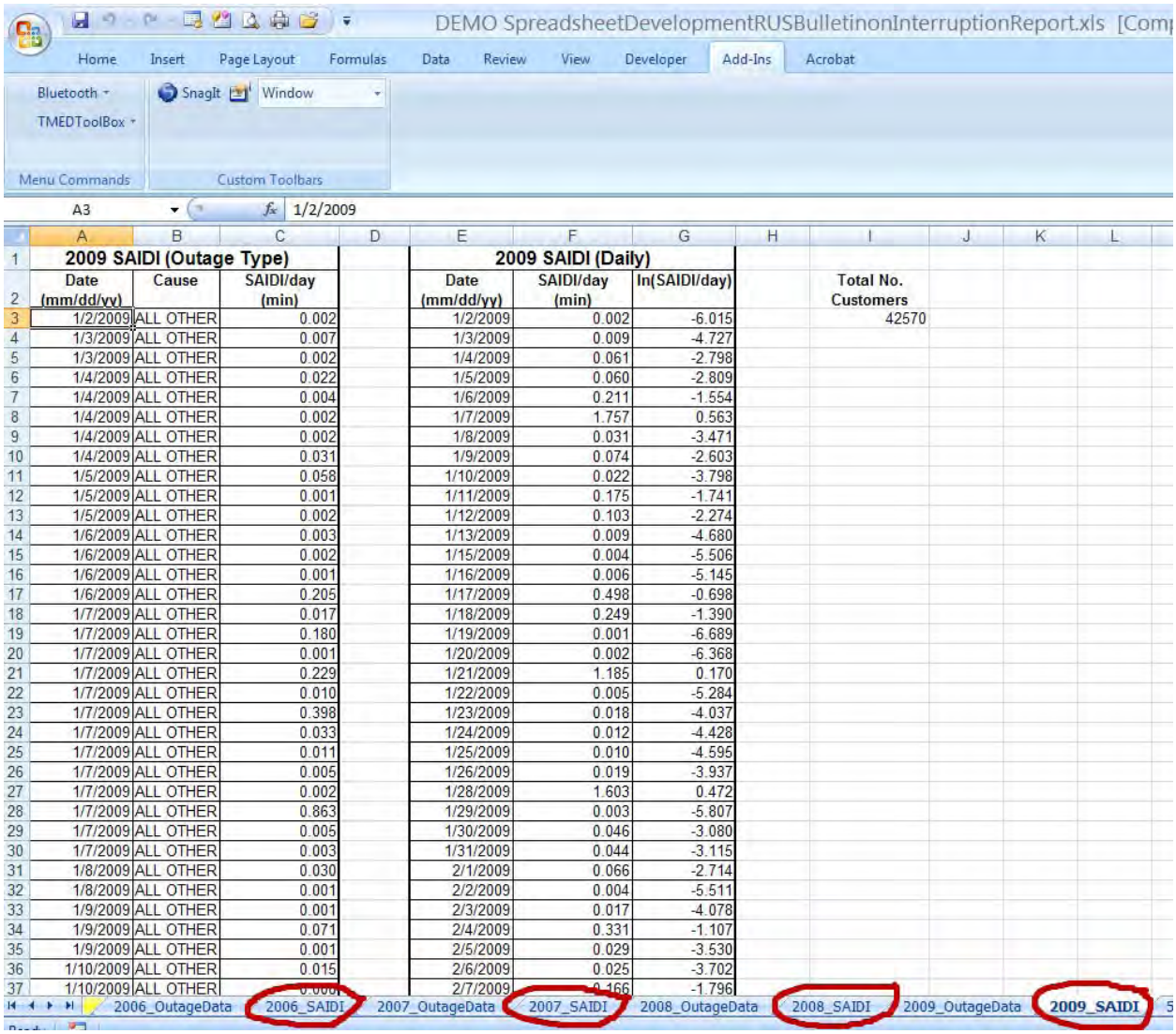
- The program will take few seconds or more to process the calculation depending on the number of row data present on the worksheet
- Once completed, a new worksheet **"2006_SAIDI"** is created and the multiple outages per day are totaled in a single row of **SAIDI/day**
- The **natural log of SAIDI/day** is also calculated and the **average number of customers** is saved on cell **"I3"**



	2006 SAIDI (Outage Type)				2006 SAIDI (Daily)				
	Date (mm/dd/yy)	Cause	SAIDI/day (min)		Date (mm/dd/yy)	SAIDI/day (min)	ln(SAIDI/day)		Total No. Customers
3	1/1/2006	ALL OTHER	0.004		1/1/2006	0.789	-0.237		40641
4	1/1/2006	ALL OTHER	0.011		1/2/2006	0.622	-0.475		
5	1/1/2006	ALL OTHER	0.246		1/3/2006	0.017	-4.046		
6	1/1/2006	ALL OTHER	0.056		1/4/2006	0.123	-2.098		
7	1/1/2006	ALL OTHER	0.372		1/5/2006	0.005	-5.319		
8	1/1/2006	ALL OTHER	0.016		1/6/2006	0.015	-4.188		
9	1/1/2006	ALL OTHER	0.013		1/7/2006	0.100	-2.306		
10	1/1/2006	ALL OTHER	0.064		1/8/2006	0.002	-6.028		
11	1/1/2006	ALL OTHER	0.008		1/9/2006	0.006	-5.091		
12	1/2/2006	ALL OTHER	0.219		1/11/2006	0.014	-4.241		
13	1/2/2006	ALL OTHER	0.017		1/12/2006	0.016	-4.126		
14	1/2/2006	ALL OTHER	0.177		1/13/2006	1.542	0.433		
15	1/2/2006	ALL OTHER	0.023		1/14/2006	0.019	-3.938		
16	1/2/2006	ALL OTHER	0.002		1/15/2006	0.302	-1.199		
17	1/2/2006	ALL OTHER	0.014		1/16/2006	0.014	-4.294		
18	1/2/2006	ALL OTHER	0.071		1/17/2006	0.012	-4.439		
19	1/2/2006	ALL OTHER	0.001		1/19/2006	0.001	-6.605		
20	1/2/2006	ALL OTHER	0.012		1/23/2006	0.010	-4.572		
21	1/2/2006	ALL OTHER	0.017		1/24/2006	0.157	-1.853		
22	1/2/2006	ALL OTHER	0.001		1/25/2006	0.026	-3.644		
23	1/2/2006	ALL OTHER	0.002		1/26/2006	0.049	-3.023		
24	1/2/2006	ALL OTHER	0.003		1/27/2006	0.004	-5.576		
25	1/2/2006	ALL OTHER	0.003		1/28/2006	0.003	-5.921		
26	1/2/2006	ALL OTHER	0.059		1/29/2006	3.809	1.337		
27	1/3/2006	ALL OTHER	0.010		1/30/2006	0.142	-1.955		
28	1/3/2006	ALL OTHER	0.006		1/31/2006	0.025	-3.669		
29	1/3/2006	ALL OTHER	0.002		2/1/2006	0.069	-2.673		
30	1/4/2006	ALL OTHER	0.123		2/2/2006	0.043	-3.154		
31	1/5/2006	ALL OTHER	0.005		2/3/2006	0.011	-4.526		
32	1/6/2006	ALL OTHER	0.002		2/4/2006	0.003	-5.664		
33	1/6/2006	ALL OTHER	0.014		2/6/2006	0.018	-4.044		
34	1/7/2006	ALL OTHER	0.003		2/8/2006	0.002	-6.158		
35	1/7/2006	ALL OTHER	0.008		2/9/2006	0.204	-1.590		
36	1/7/2006	ALL OTHER	0.029		2/10/2006	0.015	-4.172		
37	1/7/2006	ALL OTHER	0.048		2/11/2006	1.705	0.534		

Step 16

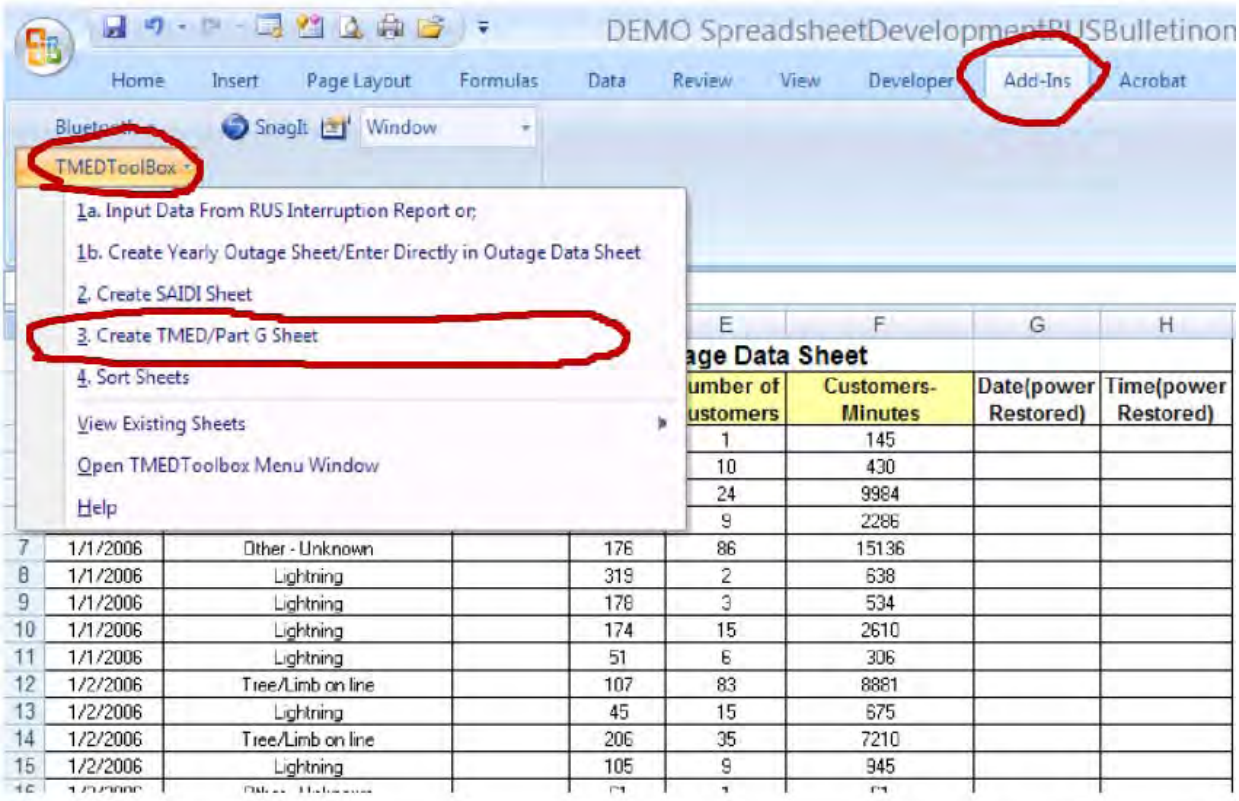
- **Repeat steps 10 to step 14** to create the **SAIDI worksheets for years 2007-2009**
- **VERY IMPORTANT **** Make sure that you create the yearly SAIDI worksheets in **sequential order** – from 2007-2009
- If successfully completed, you will see all SAIDI worksheets from 2006-2009 on the bottom of the **TMED Demo Excel Spreadsheet**



	Date (mm/dd/yy)	Cause	SAIDI/day (min)	Date (mm/dd/yy)	SAIDI/day (min)	ln(SAIDI/day)
3	1/2/2009	ALL OTHER	0.002	1/2/2009	0.002	-6.015
4	1/3/2009	ALL OTHER	0.007	1/3/2009	0.009	-4.727
5	1/3/2009	ALL OTHER	0.002	1/4/2009	0.061	-2.798
6	1/4/2009	ALL OTHER	0.022	1/5/2009	0.060	-2.809
7	1/4/2009	ALL OTHER	0.004	1/6/2009	0.211	-1.554
8	1/4/2009	ALL OTHER	0.002	1/7/2009	1.757	0.563
9	1/4/2009	ALL OTHER	0.002	1/8/2009	0.031	-3.471
10	1/4/2009	ALL OTHER	0.031	1/9/2009	0.074	-2.603
11	1/5/2009	ALL OTHER	0.058	1/10/2009	0.022	-3.798
12	1/5/2009	ALL OTHER	0.001	1/11/2009	0.175	-1.741
13	1/5/2009	ALL OTHER	0.002	1/12/2009	0.103	-2.274
14	1/6/2009	ALL OTHER	0.003	1/13/2009	0.009	-4.680
15	1/6/2009	ALL OTHER	0.002	1/15/2009	0.004	-5.506
16	1/6/2009	ALL OTHER	0.001	1/16/2009	0.006	-5.145
17	1/6/2009	ALL OTHER	0.205	1/17/2009	0.498	-0.698
18	1/7/2009	ALL OTHER	0.017	1/18/2009	0.249	-1.390
19	1/7/2009	ALL OTHER	0.180	1/19/2009	0.001	-6.689
20	1/7/2009	ALL OTHER	0.001	1/20/2009	0.002	-6.368
21	1/7/2009	ALL OTHER	0.229	1/21/2009	1.185	0.170
22	1/7/2009	ALL OTHER	0.010	1/22/2009	0.005	-5.284
23	1/7/2009	ALL OTHER	0.398	1/23/2009	0.018	-4.037
24	1/7/2009	ALL OTHER	0.033	1/24/2009	0.012	-4.428
25	1/7/2009	ALL OTHER	0.011	1/25/2009	0.010	-4.595
26	1/7/2009	ALL OTHER	0.005	1/26/2009	0.019	-3.937
27	1/7/2009	ALL OTHER	0.002	1/28/2009	1.603	0.472
28	1/7/2009	ALL OTHER	0.863	1/29/2009	0.003	-5.807
29	1/7/2009	ALL OTHER	0.005	1/30/2009	0.046	-3.080
30	1/7/2009	ALL OTHER	0.003	1/31/2009	0.044	-3.115
31	1/8/2009	ALL OTHER	0.030	2/1/2009	0.066	-2.714
32	1/8/2009	ALL OTHER	0.001	2/2/2009	0.004	-5.511
33	1/9/2009	ALL OTHER	0.001	2/3/2009	0.017	-4.078
34	1/9/2009	ALL OTHER	0.071	2/4/2009	0.331	-1.107
35	1/9/2009	ALL OTHER	0.001	2/5/2009	0.029	-3.530
36	1/10/2009	ALL OTHER	0.015	2/6/2009	0.025	-3.702
37	1/10/2009	ALL OTHER	0.006	2/7/2009	0.166	-1.796

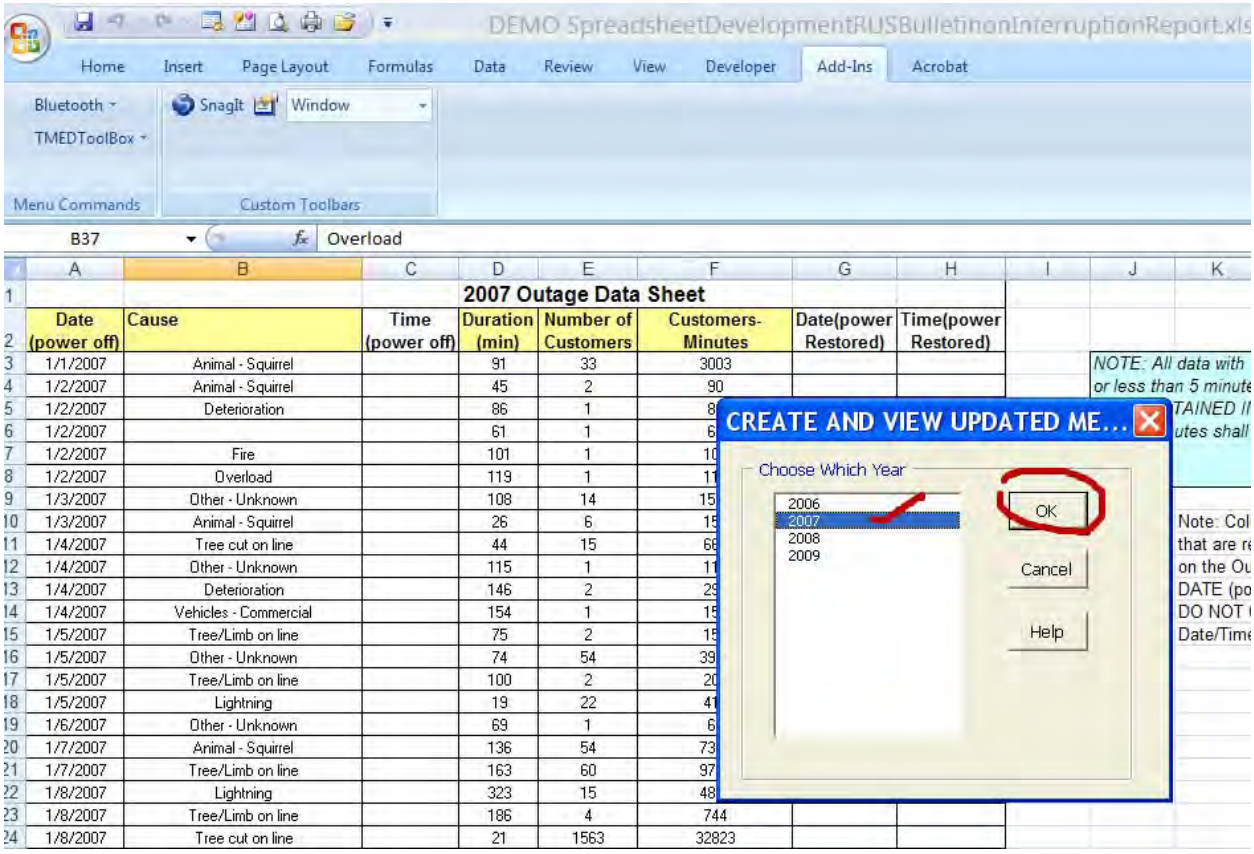
Step 17

- Now you are ready to calculate the **MED (Major Event Day) worksheets** – the TMED (threshold value), number of MEDs, MED minutes subtotal, Power Supply minutes subtotal, Planned minutes subtotal, year SAIDI minutes subtotal are calculated and saved in the MED worksheets
- In addition, the 5 year averages for the above mentioned categories and the **RUS Form7 Part G table (Service interruption)** are automatically created in the MED worksheets
- Click **"Add-Ins"** from the Excel's drop down menu (located on the top of the window)
- Click **"TMEDToolBox"** from the "Add-Ins" submenu and click **"3. Create TMED/Part G Sheet"**



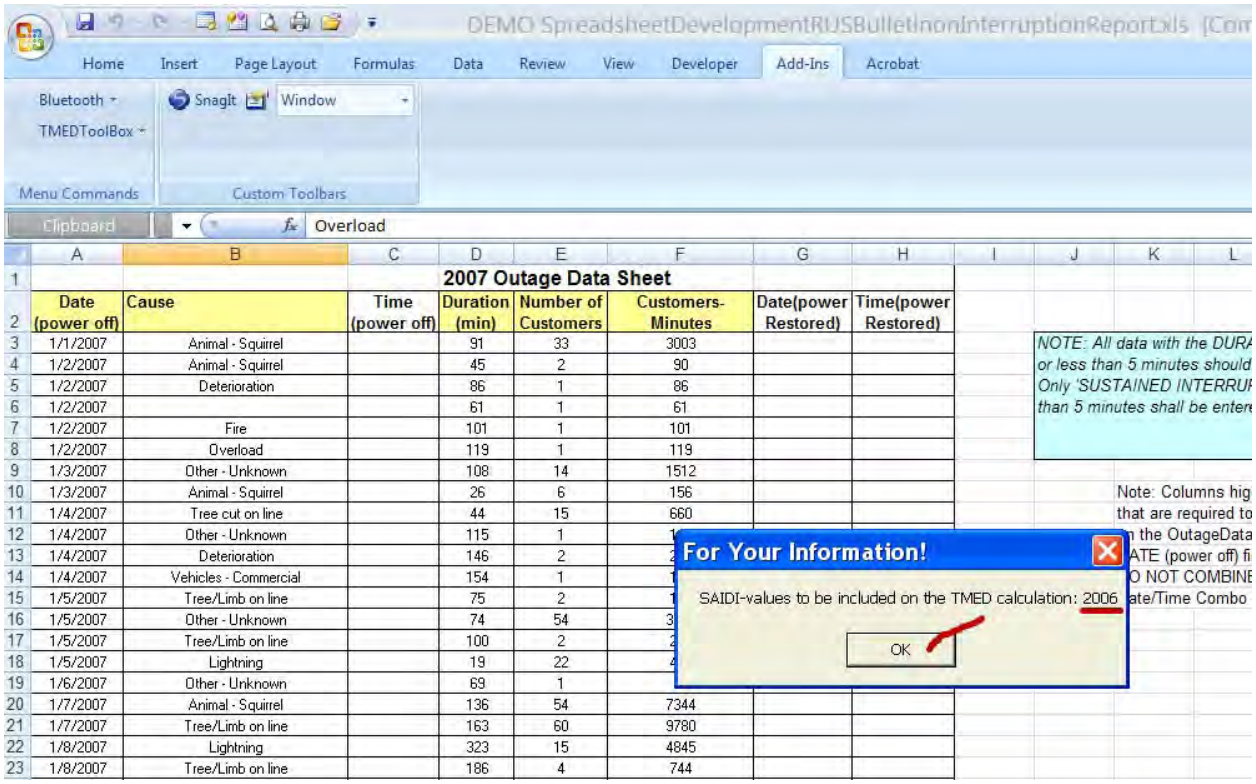
Step 18

- A box called **"Create and View Updated MED"** appears on the screen
- Click **"2007"** and click "OK – *you may be wondering* ***why we skipped 2006***. ***A minimum of one year's worth of historical outage data is required to calculate the TMED (threshold value)***. *There is no need to calculate the MED sheet for the oldest year (in this case 2006). If you accidentally click "2006" (oldest year), a reminder message will appear and the 2006 MED sheet will not be created*



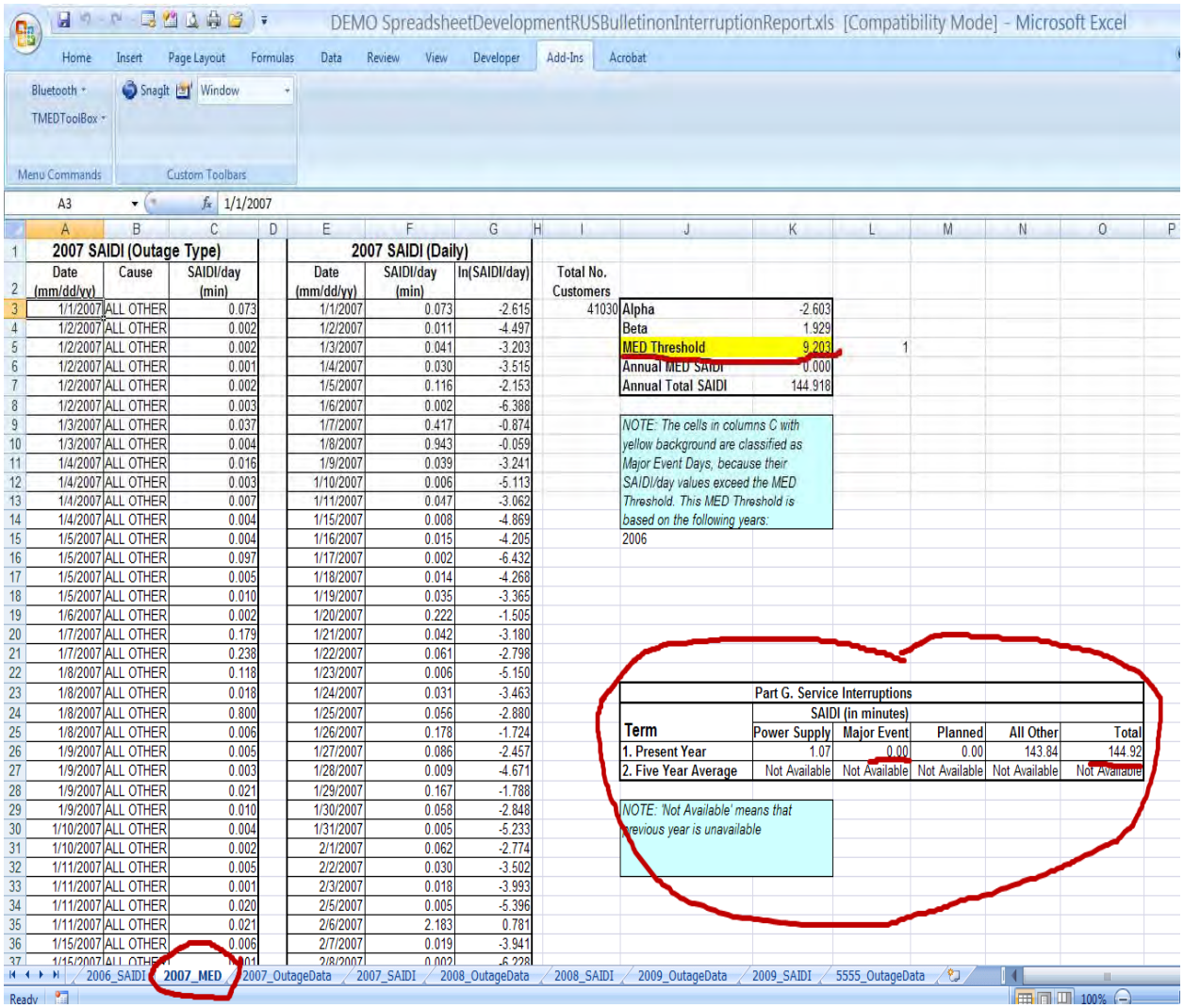
Step 19

- A box called **"For Your Information"** will appear – this reminds you which years are included in the calculation for 2007 (in this case, 2006 is the only year present prior to 2007 , thus, 2006 is shown)



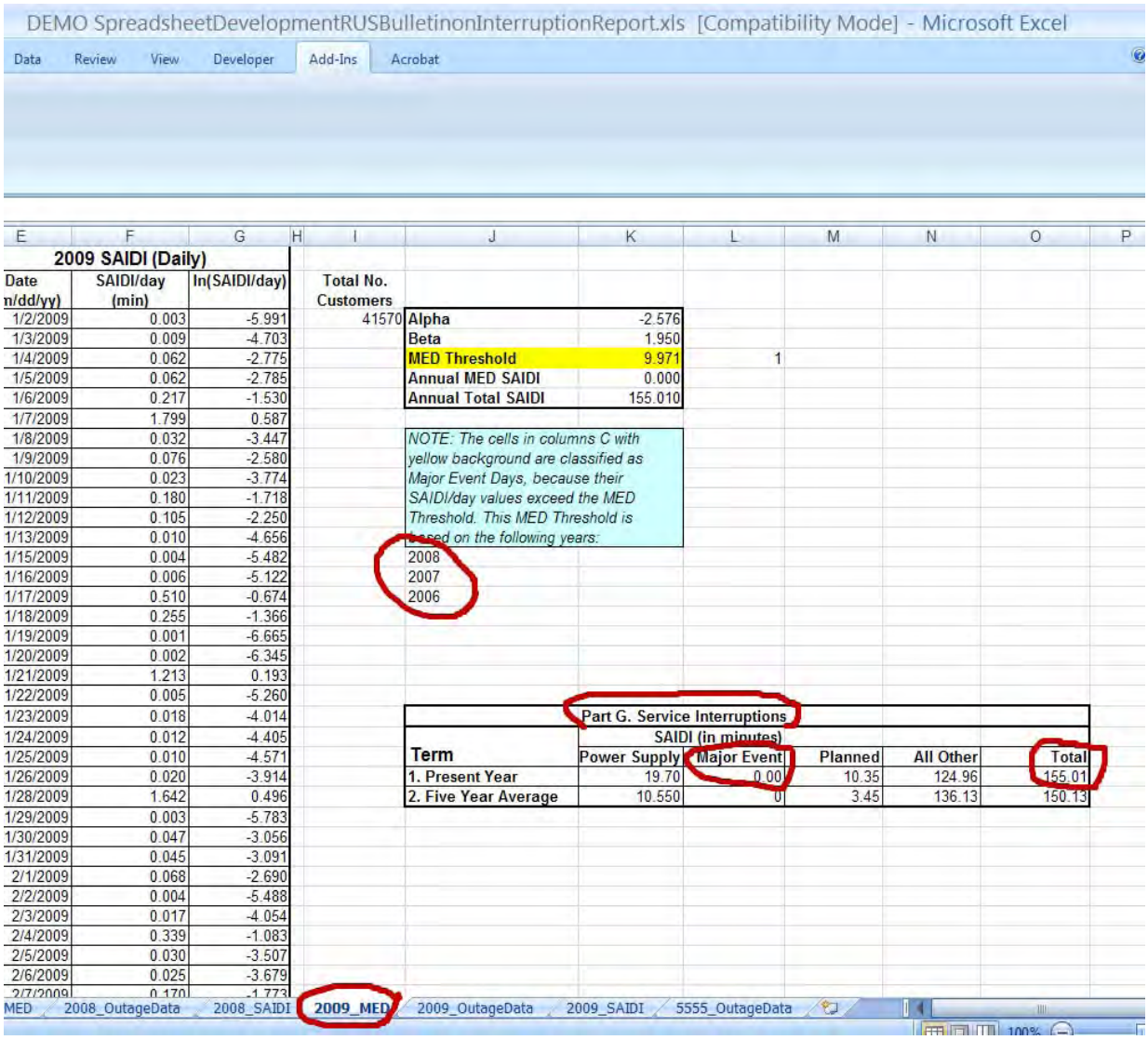
Step 20

- The program will take few seconds or more to process the calculation depending on the number of row data present on the worksheet
- Once completed, a **"2007_MED"** worksheet is created with the detailed breakdown of information including the **RUS Form & Part G**
- **"MED Threshold",** highlighted in yellow, is the **TMED value –** this value is compared to all SAIDI/day row data and any SAIDI/day value greater than the TMED is considered a Major Event Day (MED). In 2007, none of the SAIDI/day exceeded the TMED, thus, MED minutes is zero (0)



Step 21

- Create new MED worksheets for the remaining years (2008-2009) by repeating **steps 17 to 20**
- **VERY IMPORTANT **** Make sure that you create the yearly MED worksheets in sequential order – from 2007 to 2009
- If successfully completed, you will see all MED worksheets from 2007-2009 on the bottom of the **TMED Demo Excel Spreadsheet**
- Normally, there are **two important values** that are reported yearly**:**
    - o **Yearly Total SAIDI -** i.e. 155.01 minutes for 2009
    - o **Yearly SAIDI excluding MED** (**Total minutes less Major Event minutes** from art G:Service Interruption table) **–** because 2009 has zero "Major Event" minutes, the "Yearly SAIDI excluding MED" is also 155.01 minutes



Step 22 (REVIEW)

- Creating your first **OutageData, SAIDI and MED worksheets** will be time consuming because you are actually re-entering and calculating data for all historical years. However, once you have successfully setup your historical data by year, your future yearly input will be much quicker and much easier to do. For example, to enter the 2010 raw outage data, you will only need 3 steps:
    1. Create 2010_OutageData worksheet and copy/paste outage data
    2. Create a 2010_SAIDI worksheet
    3. Finally, create a 2010_MED worksheet to view the final SAIDI calculations
- Here are few important reminders:
    - ***Read Step 6*** on page 6 - **IMPORTANT Notes prior to copying raw data to the TMED worksheet
    - ***Create the SAIDI and MED yearly worksheets in sequential order – from oldest to present***

- For further inquiries contact:

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//TMED software is part of the RUS Bulletin 1739a-119 Interruption Reporting and Service Continuity Objectives for Electric Distribution System). Major Event Day methodology is based on the IEEE 1366 Guide for Electric Power Distribution Reliability Indices